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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TRINH, THANH TRUC

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/519,887	Applicant(s) TOKITA ET AL.	
	Examiner THANH-TRUC TRINH	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Remark

1. Claims 1-11 and 13-16 are pending in the application.

Claim Objections

Claim 6 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim such as claim 5. See MPEP § 608.01(n).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5-6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 depends on claims 1-4 and recites the limitation "the acidic substituent is a carboxyl group, a sulfonic group, a hydroxyl group, or a 4 carboxyphenyl group" in lines 2-3, while claims 1-4 recites the acidic substituent comprising 4-carboxyphenyl. Claim 5 is rejected for failing to further limit the subject matter of a previous claim.

Claim 6 depends on claims 1-5 and recites the limitation "at least one of R1 to R18 or at least one of R1 to R24 is an acidic substituent such as carboxyl group, a sulfonic group, a hydroxyl group, or a 4-carboxyphenyl group" In lines 14-15, while

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claims 1-4 recites the acidic substituent comprising 4-carboxyphenyl. Claim 6 is rejected for failing to further limit the subject matter of a previous claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-11 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koyanagi et al. (US Patent 6538194) in view of Osuka (WO 02/14322). Since the publication of Osuka is in Japanese, citations below are given to the U.S. Patent 6812343 that issued from US National Stage entry of this international application, which is an accurate translation. Also, a machine translation of this publication is attached to support the citation of the Examiner.

Regarding claims 1-10, as seen in Figures 1-2, Koyanagi et al. teaches a dye-sensitized solar cell comprising a metal oxide semiconductor layer 2, on which a sensitizing dye having an acidic group-containing porphyrin such as zinc tetra (4-carboxyphenyl) porphine disposed; an electrolyte layer (4) between counter electrodes 1 and 3. The porphyrin structure has acidic substituents such as 4-carboxyphenyl. (See col. 5 lines 9-65 and col. 10 lines 3-35). Koyanagi et al. also teaches the dyes such as porphyrin, ruthenium bipyridine complex, chlorophyll, etc... may be used individually or in mixture (See col. 10 lines 6-35)

Koyanagi et al. does not teach using a sensitizing dye having an acidic group containing porphyrin polymer with formulas as shown by the Applicant.

Osuka teaches using porphyrin polymer having an acidic group-containing porphyrin polymer, (See general formula 1 and col. 3 lines 64-68 and col. 4 lines 1-64). As M is 2H (See col. 3 line 30), the general formula 1 of the reference is equivalent to the general formulas in the instant claims 1 and 3. As M is a complex with metal group A (See col. 3 lines 30-36), the general formula 1 of the reference is equivalent to the general formulas in instant claims 2 and 4. Osuka also teaches n is an integer bigger than 2. (See col. 3 line 12), R1-R24 are respectively selected independently from the group consisting of hydrogen, carboxyl group, sulfonic acid (See col. 2 lines 64-68), carboxylic acid ... (See col. 3 lines 1-11), M is the metal complex comprising Zn, Mg, Ca ... (See col. 3 lines 42-36).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Koyanagi et al. by using porphyrin polymer

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as taught by Osuka, because it would provide rapid non-coherent excitation energy transfer hopping and lack of an energy sink that blocks the energy transfer. (See col. 1 lines 61-68 of Osuka). It would certainly obvious to one skilled in the art to have an acidic substituent such as 4-carboxyphenyl on a porphyrin of Osuka's porphyrin polymer because Koyanagi et al. suggests it and finds it suitable as a substituent for porphyrin.

Regarding claim 11, Koyanagi et al. teaches the semiconductor layer (2) and the electrolyte layer (4) are provided between a transparent base (5 and 1) having a transparent conductive film (1) and a conductive base (3) serving as a counter electrode of the transparent base (5 and 1), and electric energy is generated between the transparent conductive film and the conductive base by a photoelectric conversion. (See Figures 1-2, col. 5 lines 9-65).

Regarding claims 13-16, Koyanagi et al. in view of Osuka teaches all the structural limitations of claims 1-4 as described above, therefore the dye-sensitized solar cell of Wariishi et al. in view of Osuka would obviously achieve an efficiency of at least 7.2%.

Response to Arguments

Applicant's arguments with respect to claims 1-11 and 13-16 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THANH-TRUC TRINH whose telephone number is (571)272-6594. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

TT
11/25/2007